

Project 25 Compliance Assessment Program

Summary Test Report

Icom IC-F9000 Series Mobile Subscribers

STR-Icom-F9511-09152011

Device Under Test Description: Mobile Subscribers			
Manufacturer	Icom Inc		
Manufacturer Contact	Masaaki Takahashi (425) 450-6043		
Products Name:	IC-F9000 Series Mobile Radios		
Installed Options:	Hardware	136-174	IC-F9511S 01, IC-F9511T 05, IC-F9011HT 01
		400-470	IC-F9521S 01, IC-F9521T 05
		450-512	IC-F9521S 11, IC-F9521T 15
	Hardware Option	UT-125	
	Firmware	Rev. 1.4/1.6	
Installed Vocoder:	Enhanced Full Rate with System Improvements		

Test Description
P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance.
P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance.
P25-CAB-CAI_TEST_REQ – March 2011, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability.

Informative References	
Date	Title
March 2011	P25-CAB-CAI_TEST_REQ

Other devices tested with Icom IC-F9000 series radios		
Manufacture	Product Name, Definition, and Unique ID	Installed Options
Harris Corporation	P25 Trunked Infrastructure	Release 6.4.2
Motorola Inc	Motorola ASTRO 25 System	Release 7.7
Tait/EADS	TaitNet P25 / EADS COR P25 Network	EADS P25V11_03E18

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Laboratory Information	
P25 CAP Laboratory Code	P25CAP081016
Date(s) of Test	September 20, 2009 to Feb 28, 2011
Date of Issue	January 10, 2010 to Feb 28, 2011
P25 CAP Laboratory Code	P25CAP081017
Date of Test	June 22, 2009
Date of Issue	July 1, 2009
P25 CAP Laboratory Code	P25CAP081012
Date(s) of Test	July 20-24, 2009
Date of Issue	July 24, 2009
P25 CAP Laboratory Code	P25CAP081015
Date of Test	October 16, 2009
Date of Issue	November 2, 2009

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P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance		TIMCO081016 IC-F9511T TIMCO081016 IC-F9511HT TIMCO081016 IC-F9521T	
IC-F9511 VHF (136-174 MHz) and IC-F9521 (400-470MHz) Mobile Conventional Receiver Tests			
2.1.4	Reference Sensitivity	≤ -116 dBm (Class A)	P1
2.1.5	Faded Reference Sensitivity	≤ -108 dBm (Class A)	P1
2.1.6	Signal Delay Spread Capability	≥ 50 μs	P1
2.1.7	Adjacent Channel Rejection	≥ 60 dB (Class A)	P1
2.1.8	Co-Channel Rejection	≤ 9 dB	P
2.1.9	Spurious Response Rejection	≥ 80 dB (Class A)	P
2.1.10	Intermodulation Rejection	≥ 70 dB (Class B)	P
2.1.11	Signal Displacement Bandwidth	≥ 1000 Hz	P
2.1.17	Late Entry Unsquelch Delay No Talk Group or Encryption Talk Group Only Encryption Only Both (on clear of encrypted channel)	≤ 125 ms	P
		≤ 370 ms	P
		≤ 370 ms	P
		≤ 460 ms	P
2.1.18	Receiver Throughput Delay	≤ 125 ms	P

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance		TIMCO081016 IC-F9521S	
IC-F9521 (450-512MHz) Mobile Conventional Receiver Tests			
2.1.4	Reference Sensitivity	≤ -116 dBm (Class A)	P1
2.1.5	Faded Reference Sensitivity	≤ -108 dBm (Class A)	P1
2.1.6	Signal Delay Spread Capability	≥ 50 μs	P1
2.1.7	Adjacent Channel Rejection	≥ 60 dB (Class A)	P1
2.1.8	Co-Channel Rejection	≤ 9 dB	P
2.1.9	Spurious Response Rejection	≥ 80 dB (Class A)	P
2.1.10	Intermodulation Rejection	≥ 75 dB (Class A)	P
2.1.11	Signal Displacement Bandwidth	≥ 1000 Hz	P
2.1.17	Late Entry Unsquelch Delay No Talk Group or Encryption Talk Group Only Encryption Only Both (on clear of encrypted channel)	≤ 125 ms	P
		≤ 370 ms	P
		≤ 370 ms	P
		≤ 460 ms	P
2.1.18	Receiver Throughput Delay	≤ 125 ms	P

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P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance		TIMCO081016 IC-F9511T TIMCO081016 IC-F9511HT TIMCO081016 IC-F9521T TIMCO081016 IC-F9521S	
IC-F9511 VHF, IC-F9521 (400-470MHz) and IC-F9521 (450-512MHz) Mobile Conventional Transmitter Tests			
2.2.8	Unwanted Emissions: Adjacent Channel Power Ratio	≥ 67 dB	P
2.2.12	Transmitter Power and Encoder Attack Time		
	Transmitter Attack Time	≤ 50 ms	P
	Encoder Attack Time	≤ 100 ms	P
2.2.14	Transmitter Throughput Delay	≤ 125 ms	P
2.2.15	Frequency Deviation for C4FM		
	High Level Signal Deviation	2544 ≤ f _{dev} ≤ 3111 Hz	P
	Low Level Signal Deviation	848 ≤ f _{dev} ≤ 1037 Hz	P
2.2.16	Modulation Fidelity	≤ 5% (Class A)	P
2.2.18	Transient Frequency Behavior		
	Time Interval t ₁ = 5 ms	Δf ≤ 12.5 kHz	P
	Time Interval t ₂ = 20 ms	Δf ≤ 6.25 kHz	P
	Time Interval t ₃ = 5 ms	Δf ≤ 12.5 kHz	P

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance		TIMCO081016 IC-F9511T TIMCO081016 IC-F9511HT TIMCO081016 IC-F9521T	
IC-F9511 VHF and IC-F9021 (400-470MHz) Mobile Trunked Receiver Tests			
2.1.4	Reference Sensitivity	≤ -116 dBm (Class A)	P1
2.1.5	Faded Reference Sensitivity	≤ -108 dBm (Class A)	P1
2.1.6	Signal Delay Spread Capability	≥ 50 μs	P1
2.1.7	Adjacent Channel Rejection	≥ 60 dB (Class A)	P1
2.1.8	Co-Channel Rejection	≤ 9 dB	P
2.1.9	Spurious Response Rejection	≥ 80 dB (Class A)	P
2.1.10	Intermodulation Rejection	≥ 70 dB (Class B)	P
2.1.11	Signal Displacement Bandwidth	≥ 1000 Hz	P

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance		TIMCO081016 IC-F9521S	
IC-F9521 (450-512MHz) Mobile Trunked Receiver Tests			
2.1.4	Reference Sensitivity	≤ -116 dBm (Class A)	P1
2.1.5	Faded Reference Sensitivity	≤ -108 dBm (Class A)	P1
2.1.6	Signal Delay Spread Capability	≥ 50 μs	P1
2.1.7	Adjacent Channel Rejection	≥ 60 dB (Class A)	P1
2.1.8	Co-Channel Rejection	≤ 9 dB	P
2.1.9	Spurious Response Rejection	≥ 80 dB (Class A)	P
2.1.10	Intermodulation Rejection	≥ 75 dB (Class A)	P
2.1.11	Signal Displacement Bandwidth	≥ 1000 Hz	P

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P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance		TIMCO081016 IC-F9511T TIMCO081016 IC-F9511HT TIMCO081016 IC-F9521T TIMCO081016 IC-F9521S	
IC-F9511 VHF, IC-F9521 (400-470MHz) and IC-F9521 (450-512MHz) Mobile Trunked Transmitter Tests			
2.2.8	Unwanted Emissions: Adjacent Channel Power Ratio	≥ 67 dB	P
2.2.12	Transmitter Power and Encoder Attack Time		
	Transmitter Attack Time	≤ 50 ms	P
	Encoder Attack Time	≤ 100 ms	P
2.2.14	Transmitter Throughput Delay	≤ 125 ms	P
2.2.15	Frequency Deviation for C4FM		
	High Level Signal Deviation	2544 ≤ f _{dev} ≤ 3111 Hz	P
	Low Level Signal Deviation	848 ≤ f _{dev} ≤ 1037 Hz	P
2.2.16	Modulation Fidelity	≤ 5% (Class A)	P
2.2.18	Transient Frequency Behavior		
	Time Interval t ₁ = 5 ms	Δf ≤ 12.5 kHz	P
	Time Interval t ₂ = 20 ms	Δf ≤ 6.25 kHz	P
	Time Interval t ₃ = 5 ms	Δf ≤ 12.5 kHz	P

P25-CAB-CAI_TEST_REQ – March 2010, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance		TIMCO081016 IC-F9511T TIMCO081016 IC-F9511HT TIMCO081016 IC-F9521T TIMCO081016 IC-F9521S	
IC-F9011 VHF, IC-F9521 (400 - 470MHz), IC-F9521 (450 - 512MHz) Mobile Trunked Transmitter Tests			
2.3.1	Trunking Control Channel Slot Times (45 ms Slot)		
	Encoder Attack Time	2.0 ms ≤ t ≤ 11.65 ms	P
	RF Power Attack Time	0.0 ms ≤ t ≤ 11.65 ms	P
	RF Turn Off Time	≤ 1.57 ms	P
2.3.2	Trunking Request Time (45 ms Slot)	≤ 167 ms	P
2.3.3	Trunking Voice Access Time	≤ 1000 ms	P
2.3.5	Transmitter Time to Key on a Traffic Channel		
	RF TX time to Key – Working Channel	150 ms	P
	Encoder Transmit Time	150 ms	P

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P25-CAB-CAI_TEST_REQ – September 2009, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability		DTR- P25CAP081017- 1090622101	DTR-MOT-40018- M4	DTR- P25CAP081015- 0383
Icom IC-F9000 Series Subscriber Radios		Harris P25 Trunked Infrastructure System	Motorola Astro P25	Taitnet/EADS COR P25 Infrastructure
Test Case	Description	Result		
2.2.1	Full Registration			
2.2.1.4.1	Test Case 1 - Valid Registration			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.1.4.2	Test Case 2 – Denied or Refused Registration			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.1.4.3	Test Case 3 – Unverified Registration			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.2	Group Voice Call			
2.2.2.4.1	Test Case 1 – Group Call Granted			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.2.4.2	Test Case 2 – Group Call Denied			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.2.4.3	Test Case 3 – Group Call Request Queued			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3

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P25-CAB-CAI_TEST_REQ – September 2009, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability		DTR- P25CAP081017- 1090622101	DTR-MOT-40018- M4	DTR- P25CAP081015- 0383
Icom IC-F9000 Series Subscriber Radios		Harris P25 Trunked Infrastructure System	Motorola Astro P25	Taitnet/EADS COR P25 Infrastructure
Test Case	Description	Result		
2.2.3	Unit-to-Unit Voice Call			
2.2.3.4.1	Test case 1: Unit-to-unit call with target availability check			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.3.4.2	Test case 2: unit-to-unit call with target availability check			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.3.4.3	Test case 3: Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment After Target Availability Check			
	Home Configuration	P	P	N/A1
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.3.4.4	Test case 4: Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment Before Target Availability Check			
	Home Configuration	N/A2	N/A2	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.3.4.5	Test case 5: Unit-to-Unit Call without Target Availability Check			
	Home Configuration	N1	P	N1
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.3.4.6	Test case 6: Unit-to-Unit Call Queued without Target Availability Check			
	Home Configuration	N1	P	N1
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3

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Icom IC-F9000 Series Subscriber Radios		Harris P25 Trunked Infrastructure System	Motorola Astro P25	Taitnet/EADS COR P25 Infrastructure
Test Case	Description	Result		
2.2.3.4.7	Test case 7: Unit-to-unit call denied			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.4	Broadcast Voice Call			
2.2.4.4.1	Test case 1: Broadcast voice call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.5	Affiliation			
2.2.5.4.1	Test case 1: Radio permitted to affiliate with new group			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.5.4.2	Test case 2: Radio denied affiliation to new group			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.5	Affiliation			
2.2.5.4.1	Test case 1: Radio permitted to affiliate with new group			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3

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P25-CAB-CAI_TEST_REQ – September 2009, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability		DTR- P25CAP081017- 1090622101	DTR-MOT-40018- M4	DTR- P25CAP081015- 0383
Icom IC-F9000 Series Subscriber Radios		Harris P25 Trunked Infrastructure System	Motorola Astro P25	Taitnet/EADS COR P25 Infrastructure
Test Case	Description	Result		
2.2.6	Announcement Group Call			
2.2.6.4.1	Test case 1: Collection of talk groups receive call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.7	Emergency Alarm			
2.2.7.4.1	Test case 1: Emergency alarm			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.8	Emergency Call			
2.2.8.4.1	Test case 1: Emergency call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.10	Encryption			
2.2.10.4.1	Test case 1: Call privacy for encrypted call			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3
2.2.11	Registration Area Roaming			
2.2.11.4.1	Test case 1: Idle Radio			
	Home Configuration	P	P	P
	Inter-System Roaming Configuration	N2	N2	N2
	Inter-WACN Roaming Configuration	N3	N3	N3

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Model Class: IC-F9000 Mobile Subscribers	
Product Name, Definition and Unique ID	Model Number and Installed Options
VHF	
IC-F9511S VHF Mobile with limited keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9511S 01 Option Encryption
IC-F9511T VHF Mobile with full keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9511T 05 Option Encryption
IC-F9511HT VHF Mobile with full keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9511T 05 Option Encryption
UHF (400-470 MHz)	
IC-F9521S UHF Mobile with limited keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9521S 01 Option Encryption
IC-F9521T UHF Mobile with full keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9521T 05 Option Encryption
UHF (470-512 MHz)	
IC-F9521S UHF Mobile with limited keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9521S 11 Option Encryption
IC-F9521T UHF Mobile with full keypad Firmware/DSP: Revision 1.4 through 1.6	IC-F9521T 15 Option Encryption
Test Case Result Definitions	
No Test Performed	---
Test Does Not Apply to the Test Object	N
Test Object Meets Requirements	P (Pass)
Test Object Does Not Meet Requirements	F (Fail)
Test Object is Not Conclusive	I (Inconclusive)
Comments	
N/A1: Test Case 2.2.3.4.3 is not applicable for Tait infrastructure; see results of test case 2.2.3.4.4.	
N/A2: Test Case 2.2.3.4.4 is not applicable for Motorola and Harris infrastructure; see results of test case 2.2.3.4.3.	
N1: Test Case 2.2.3.4.5 and 2.2.3.4.6 are not supported by Motorola and Tait infrastructure	
N2: Icom subscriber unit and FNE from Motorola, Tait and Harris does not support Inter-System Roaming. At result, Inter-System Roaming was not tested	
N3: Icom Subscriber unit supports Inter-WACN Roaming. However FNE from Motorola, Tait and Harris does not support Inter-WACN Roaming. At result, Inter-WACN Roaming was not tested.	
P1: F9000 series radio does not support simulcast	

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OMB NO: 1640-0015

EXPIRATION DATE: 04/30/2012

Burden Statement

An agency may not conduct or sponsor information collection and a person is not required to respond to this information collection unless it displays a current valid Office of Management and Budget control number and an expiration date. The control number for this collection is 1640-0015 and this form will expire on 04/30/2012. The estimated average time to complete this form is 60 minutes per respondent. If you have any comments regarding the burden estimate you can write to Department of Homeland Security, Science and Technology Directorate, Washington, DC 20528.

DHS FORM 10044 – June 2009